
Engineered human stem cells destroy HIV infected cells

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A group at the University of California, Los Angeles AIDS Institute has manipulated human blood-forming stem cells to fight HIV infected cells. The technique could conceivably be used to help the body fight any number of viral infections, the authors say.

The researchers started with blood-forming stem cells normally found in the bone marrow. These cells form all the cells of the human blood system including immune and red blood cells. They then inserted a gene from an immune cell of an HIV-infected individual. That protein can recognize the HIV virus and would ordinarily guide the person's immune system to attack infected cells. In an HIV-infected person so few of those infection-fighting cells exist that the immune system can't do its job.

The idea was that blood-forming stem cells carrying that HIV-targeting protein would mature into an immune system primed to recognize and destroy HIV-infected cells.

To test their idea, the authors inserted the engineered stem cells into mice. These mice also had transplanted into them a human thymus, the organ that is responsible for making a population of infection-fighting cells called T cells. (The human T cells can't mature properly in the mouse thymus. By implanting the mouse with a human thymus the researchers mimicked how the cells might behave in a human.) As they hoped, the blood-forming stem cells produced human T cells that were able to kill HIV-infected cells.

The authors called this study a proof-of-principle, saying that by inserting different proteins into the blood-forming stem cells they could direct the immune system to attack Hepatitis, herpes or human papillomavirus.

A press release by UCLA quotes Jerome Zack, an author on the paper and CIRM grantee, as saying:

“This approach could be used to combat a variety of chronic viral diseases. It's like a genetic vaccine.”

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